72-1

Highway Safety Literature

An Announcement of Recent Acquisitions. . .

HSL No. 72-1 January 14, 1972 HS-010 370 - HS-010 429, HS-800 523 - 524, 541, 583, HS-810 179 & 181

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THIS ISSUE CONTAINS:

HS-010 370 - HS-010 429
HS-800 523 - 524, 541, 583
HS-810 179 & 181

U.S. Department of Transportation / National Highway Traffic Safety Administration

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AN ANNOUNCEMENT OF RECENT ACQUISITIONS

Published Twice a month (24 times a year) by the National Traffic Safety Administration
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INTRODUCTION

Publications announced in *Highway Safety Literature* include the most recent additions to the collection of the NHTSA Scientific & Technical Information Service. Subject areas covered include all phases of highway, motor vehicle, and traffic safety, especially those encompassed by the National Traffic and Motor Vehicle Safety Act of 1966 and the Highway Safety Act of 1966.

Individual issues of *HSL* are numbered according to the year and the issue number within that year; thus, 71 designates the year and 1, 2, 3, etc. the individual issues. To aid the user in locating citations by the HS-number, the cover bears the inclusive entry number for each issue.

Entries in *HSL* are arranged according to the NHTSA Subject Category List shown in the Table of Contents. The list is a two-level arrangement consisting of five major subject fields subdivided into 59 subject groups. Documents related directly to the National Highway Traffic Safety Administration (NHTSA) are announced in a separate section headed NHTSA DOCUMENTS and are numbered in five distinct series: NHTSA Accident Investigation Reports (HS-600 000 series). NHTSA Compliance Test Reports (HS-610 000 series), NHTSA Contractors Reports (HS-800 000 series), NHTSA Staff Speeches, Papers, etc. (HS-810 000 series), and NHTSA Imprints (HS-820 000 series). For NHTSA DOCUMENTS in series HS-600 000 and HS-610 000, individual full case reports are available for inspection at the National Highway Traffic Safety Administration. HS-800 000 series and HS-800 000 series are available for purchase from NTIS or GPO (see page ii). Although announced together in a separate section, these documents are also assigned specific subject categories for machine retrieval.

A document which contains a number of separate articles is announced as a complete volume in the subject category most applicable to it as a whole. Entries for the individual articles appear in their most specific subject category.

SAMPLE ENTRIES

Subject Category Array	
NHSB Accession no......	HS-800 218 Fld. 5/21; 5/9
Title of document.........	AN INVESTIGATION OF USED CAR SAFETY STANDARDS–SAFETY INDEX: FINAL REPORT. VOL. 6 - APPENDICES G-L
Personal author(s).........	by E. N. Wells; J. P. Fitzmaurice; C. E. Guilliams; S. R. Kalin; P. D. Williams
Corporate author..........	Operations Research, Inc.
Collation	
Publication date............	1969 150p Contract FH-11-6921 Report no. ORI-TR-553-Vol-6; PB-190 523
Abstract........................	Appendices G-L to this study of used car safety standards include: indenture model diagrams for classes I-IV motor trucks; degradation, wear, and failure data for motor truck classes I-IV; and safety index tables for classes I-IV motor trucks.

Search terms; Wear; Trucks; Failures; Used cars; Inspection standards

AVAILABILITY: NTIS

HS-004 497 Fld. 5/19

AUTO THEFT–THE PROBLEM AND THE CHALLENGE

by Thomas A. Williams, Sr.

Journal citation . . . Published in *FBI Law Enforcement Bulletin* v37 n12 p15-7 (Dec 1968)

Gives figures on the extent of the auto theft problem and comments on antitheft devices available now or in the planning stage.

Search terms: Theft; Theft protection; Stolen cars

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NOTE: ( ) Numbers in parentheses following certain subject groups indicate the Highway Safety Program Standards (No. 1, and up) and/or Federal Motc. Vehicle Safety Standards (No. 101 and up) which may apply to these groups.

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NOTE: Material published in Highway Safety Literature (HSL) is intended for the information and assistance of the motor vehicle and highway safety community. While brand names, equipment model names and identification, and companies may be mentioned from time to time, this data is included as an information service. Inclusion of this information in the HSL should not, under any circumstances, be construed as an endorsement or an approval of any particular product, course, or equipment by the U. S. Department of Transportation, National Highway Traffic Safety Administration.

Harry A. Feinberg
Managing Editor

AVAILABILITY OF DOCUMENTS
AND
INSTRUCTIONS FOR ORDERING

Articles and reports whose citations and abstracts appear in HSL are acquired from many sources, such as periodicals, journals, NHTSA Contractors' reports and NHTSA staff speeches, and other reports. Those reports other than NHTSA Contractors' reports and NHTSA generated reports and speeches (see introduction) are assigned a lower consecutive accession (HS-) number.

Department of Transportation presonnel may borrow copies of publications announced in HSL from the NHTSA Technical Reference Division. Non-DOT Personnel, in the Washington, D.C. area, may borrow copies of publications for a 24-hour period only. Telephone (202) 426-2768. Government personnel in the Washington, D.C. area, use government ID phone 118-62768.

The names of the journals cited in HSL appear in italic type preceded by the words "Published in." The journal containing the article cited may be borrowed from most research and public libraries. Non-DOT personnel ouside the Washington area should contact their company or agency libraries for assistance.

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GPO: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Give corporate author, title, personal author, and report number . Prepayment is required by GPO coupon (NTIS coupons are not acceptable), check or money order (made payable to the Superintentent of Documents).

HRB: Highway Research Board, National Academy of Sciences, 2101 Constitution Ave., N. W., Washington, D. C. 20418.

NHTSA: National Highway Traffic Safety Administration, General Services Division, Washington, D.C. 20590 (Telephone (202) 426-0874), Give HS-No.

SAE: Society of Automotive Engineers, Dept. HSL, 2 Pennsylvania Plaza, New York, N.Y. 10001. Order by SAE report numbers. Prices given are list; discounts are available to SAE members and sometimes to libraries and U.S. Government Agencies. Prepayment is required; orders received without payment are subject to a $1 handling charge.

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1/0 ACCIDENTS

1/1 Emergency Services

HS-010 370 Fld. 1/1

SURVEY OF EMERGENCY SERVICES IN GENERAL HOSPITALS, WISCONSIN, 1968

Wisconsin Dept. of Health and Social Services

1968 34p 23 refs

The Bureau of Health Statistics of Wisconsin surveyed 132 general hospitals regarding the organization and administration of the emergency service, staffing patterns, equipment and ancillary services, volume of patients, and communication among hospitals and ambulances, fire, and police departments. It was determined that emergency services vary greatly and that all but three of the hospitals have an emergency room.

> Search terms: Hospital emergency rooms; Emergency medical services; Communication systems; Emergency reporting systems; Wisconsin; Questionnaires; Surveys; First aid

1/2 Injuries

HS-010 371 Fld. 1/2

WHIPLASH INJURIES

by Robert Bingham

Published in *Medical Trial Technique Quarterly* v14 p279-90, 496-507 (Jun 1968)

3 refs

> Presented before the California Trial Lawyers Assoc., 13 Jun 1966.

Whiplash injuries most often occur as the result of rear end automobile collisions. Their mechanism is of forcible hyperextension followed by forcible hyperflexion of the cervical or the lumbar spine, or both. The injuries are to the muscles and muscle attachments of the spine, the vertebrae, the intervertebral discs, and the intervertebral joints and ligaments. X-rays often fail to demonstrate the extent of the injuries. The more severe injuries are likely to become progressively worse over a period of weeks or months. These are two forms of treatment; immobilization, which usually hastens recovery, but may result in a more permanent disability, and active treatment, which prolongs disability but may give a better result. When X-rays and preliminary reports appear to minimize the injury, the plaintiff's claim may still be presented effectively. It is concluded that very few whiplash claimants are malingering.

> Search terms: Whiplash injuries; Spinal injuries; Rear end collisions; Head movement; Medical treatment; Injury compensation; Neck injuries; Injury severity; Evidence; Medical case reports; Neck motion range

HS-010 372 Fld. 1/2; 1/5

CHILDREN IN TRAFFIC ACCIDENTS

by G. Anthony Ryan

Published in *Pediatrics* v44 Supp p847-54 (Nov 1969)

11 refs

This paper is based on an interdisciplinary study conducted in Adelaide, South Australia, in 1963 to 1965, of 408 injury-producing traffic accidents. Children were involved as pedestrians, bicyclists, and car occupants. In all three cases, children tended to receive fewer injuries than adults. The distribution of injuries for both children and adults was substantially the same. As pedestrians and bicyclists, children had their own patterns of behavior distinct from adults. Children sitting in the front seat of a car receive more injuries than children in the back seat. Children in either seat are injured less often than adults in the same seat.

> Search terms: Injury statistics; Chi square test; Child injuries; Injury causes; Children; Age factors; Injuries by age; Young pedestrians; Pedestrian injuries; Injuries by seat occupation; Passenger injuries; Bicycle rider injuries; Injury severity; Multidisciplinary teams; Injuries by body area; Bicycle accidents; Pedestrian accidents; Driver injuries

HS-010 373 Fld. 1/2; 5/22

TRUCK TIRE-RIM INJURY – A NEW TRAUMA ENTITY

by Basilio N. Bautista; Desmond A. Kernahan; Lars M. Vistnes

Published in *Plastic and Reconstructive Surgery* v47 n2 p117-21 (Feb 1971)

14 refs

> Presented at the Plastic Surgery Resident's Conference, Ann Arbor, 22-23 May 1969.

Off-the-road changing of a truck tire is a dangerous task; extra care should be exercised to avoid crippling injury or even death. Due to the proximity between the tire and the mechanic, maxilofacial injuries are most common when a tire blows out and propels the rim at an undetermined velocity. If the mechanic has a proper understanding of his work, and if he exercises suitable care and takes the recommended precautions, this specific type of injury can be prevented. Five case reports are described, one of which was a fatality. This type of accident occurs with truck drivers and service station attendants. The rim blows apart in these accidents, generally when the tire is being changed, inflated, or deflated.

> Search terms: Facial injuries; Truck tires; Tire repair; Mechanics (personnel); Tire inflation pressure; Tire failures; Facial bone fractures; Fatalities; Truck drivers; Injury case reports; Rim failures

1/3 Investigation

HS-010 374 Fld. 1/3

ROLE OF ACCIDENT INVESTIGATION COMMITTEE

Anonymous

Published in *Traffic Safety* v69 n10 p13, 39-40, 42 (Oct 1969)

The role of the accident review committee in a company safety program is to determine whether or not an accident was preventable. When the committee is reviewing an accident, the name of the driver should remain anonymous. The committee should have the driver's report of the accident, police investigation reports, insurance company investigation reports, facts based on an investigation by company representatives, statements of witnesses, and any other available evidence. The driver's immediate supervisor decides what corrective measures are to be taken. The driver has the right of appeal if he feels that the decision of the committee is not satisfactory.

Search terms: Accident analysis; Safety programs; Driver error caused accidents; Accident investigation; Fleet safety; Evidence; Accident causes

1/5 Statistical Data

HS-010 375 Fld. 1/5

ANALYSIS OF 104 EASTERN IOWA MOTOR VEHICLE CASUALTY ACCIDENTS

by George W. Brown

Iowa Univ.

[1967] 42p 4 refs

From a sample population of victims brought to Iowa University hospitals during February 1966 to February 1967, 104 accidents were studied. Drivers were interviewed in depth, vehicles and damage examined, and road location and environmental factors recorded. Casualties were 223 injuries (almost half to neck and head) and 35 deaths. Analysis indicated that accidents involve a complex of relationships between driver, vehicle, and environment. The prevalent belief that 85 percent of accidents are driver caused is erroneous. Vehicle, roadway, and driver contributory factors are given, and statistical data are presented including locations, times, and make and year of vehicles. Some 335 vehicle related factors were discovered, of which the most important were tire problems, visibility problems, and front wheel misalignment.

Search terms: Vehicle vehicle collisions; Reduced visibility caused accidents; Accident analysis; Accident factors; Wheel alignment; Accident location; Tire failure caused accidents; Accident statistics; Accidents by vehicle age; Accidents by vehicle condition; Accidents by vehicle make; Fatalities; Failure caused accidents; Injury statistics; Injury causes; Driver age; Single vehicle accidents; Driver characteristics; Driver error caused accidents; Road condition caused accidents; Iowa; Driver vehicle road interfaces; Environmental factors; Time of accidents; Secondary collisions

HS-010 376 Fld. 1/5

WISCONSIN SCHOOL BUS ACCIDENT FACTS 1967-68

Wisconsin Dept. of Transp.

1968 15p

This statistical report shows the Wisconsin school bus accident severity in 1967-68 as compared to the 1966-67 school year. Included is a breakdown of accidents according to highway classification, character of roadway and condition of road surface, light and weather conditions, locations and age of school buses.

Search terms: School bus accidents; Wisconsin; Accident statistics; Accidents by vehicle age; Accident severity; Highway classification; Meteorological data; Day vs night accidents; Road conditions; Accident factors; Accident location; Impact angle; Male drivers; Female drivers; Driver age; Light conditions

HS-010 377 Fld. 1/5; 3/3; 5/3

MOTORCYCLE ACCIDENT FACTS 1970

Washington State Patrol

1970 12p

Cycle registration in 1970 rose 26%, but accidents increased 43%, and injury accidents 98%. Fatal accident rate per 10,000 registered cycles was 7.2, compared to the high point of 8.3 reached before the 1967 helmet and safety law enactment. However, this is an increase over the 1969 rate of 5.4, and is attributed to inexperience with higher powered cycles and increased mileage. Statistics are presented by county, road type and curvature, urban and rural areas, operator age, type of accident, time of occurrence, violations charged, light conditions, and type of injury.

Search terms: Accident statistics; Motorcycle accidents; Motorcycle laws; Motorcycle operator fatalities; Motorcycle operator injuries; Motorcycle power; Motorcycle registration; Headgear laws; Washington; Accident studies; State laws; Accident types; Time of accidents; Accident location; Accident rates; Highway characteristics; Day of week; Month; Traffic law violations; Light conditions

HS-010 378 Fld. 1/5; 3/11

SUMMARY OF PEDESTRIAN TRAFFIC ACCIDENTS, 1968

Washington State Patrol

[1969] 12p

Statistics for Washington (except the cities of Seattle, Spokane, and Tacoma) are given on 929 accidents in which 90 pedestrians were killed and 899 injured. Two-thirds of the accidents occurred in daylight; one-third were concentrated between 3 and 6 p.m. Summaries include type of accident, month, day of week, pedestrian's actions, age, occupation, violation charged, drinking involvement, accident location, weather, light, and road surface.

Search terms: Pedestrian accidents; Accident statistics; Vehicle pedestrian collisions; Pedestrian age; Pedestrian behavior; Pedestrian characteristics; Pedestrian fatalities; Day of week; Pedestrian intoxication; Month; Accident types; Accident factors; Accident location; Drinking pedestrians; Washington; Urban accidents; Rural accidents; Light conditions; Pedestrian injuries

HS-010 379 Fld. 1/5; 5/20

ROAD ACCIDENTS INVOLVING ARTICULATED VEHICLES (SEMI-TRAILERS) IN QUEENSLAND (1965-1967)

by J. I. Tonge

Published in *Medical Journal of Australia* v1 p995-9 (8 May 1971)

4 refs

A survey of 1,535 accidents involving articulated vehicles in Queensland during the period 1965-1967 is presented. Factors concerning the environment, vehicle, driver and outcome have been analyzed. Articulated vehicles appear to be involved in four times as many accidents (five times as many fatal, three times as many injury) as all vehicles taken together. Companies owning fewer than 10 prime movers were found to be involved in approximately half as many accidents as those owning more than 10. Recommendations include specialized driver training and testing, use of seat belts, crashworthy cabin design, and random checks of drivers for alcohol and drugs, and vehicles for mechanical defects.

Search terms: Truck accidents; Semi-trailers; Articulated vehicles; Driver age; Driver characteristics; Accident factors; Accident prevention; Accident rates; Accident statistics; Accidents by vehicle make; Australia; Time of accidents; Fatality rates; Injury rates; Accident location; Accident types; Drinking drivers

2/0 HIGHWAY SAFETY

2/9 Traffic Control

HS-010 380 Fld. 2/9; 3/4

DETECTION OF VEHICLE VELOCITY CHANGES IN CAR-FOLLOWING

by E. R. Hoffman

Melbourne Univ. (Australia)

Published in *Australian Road Research Board Proceedings of the 4th Conference*, Melbourne, 1968 v4 pt1 p821-37

3 refs
Report no. Paper-443

A survey is made of past work on the detection of vehicle velocity changes in car-following. The hypothesis is made that detection is dependent on changes of the visual angle subtended by the lead vehicle at the eye of a subject in the following vehicle, and also on the time rate of change of this visual angle. Reanalysis of experimental data gives results consistent with this hypothesis. It appears that when rate of change of visual angle is small, it has a degrading effect on detection by changes in visual angle.

Search terms: Headways; Headway variances; Car following; Following distance; Driver performance; Speed changes; Mathematical models; Velocity perception

3/0 HUMAN FACTORS

3/1 Alcohol

HS-010 381 Fld. 3/1

SCIENTIFIC PROBLEMS ASSOCIATED WITH THE ROAD SAFETY ACT 1967

by Ann E. Robinson; Francis E. Camps

Published in *Medicine Science and the Law* v10 n2 p69-75 (Apr 1970)

5 refs

The accuracy of blood and urine analyses for alcohol has often been reduced by poor sample handling. The gas chromatographic method gives a standard deviation of less than two percent; a three-times correction factor is applied to ensure a less than one in 100,000 probability of chance error. Data on time of day of collection and alcohol concentrations are given, with recommendations for better containers, storage, and less delay in sending in samples.

Search terms: Blood analysis; Blood alcohol levels; Urine alcohol levels; Gas chromatography; Driver intoxication; Drinking driver evidence; Great Britain; Road Safety Act of 1967 (Great Britain); Time of day; Alcohol blood tests; Laboratory tests

HS-010 382 Fld. 3/1; 4/1

KNOW THE LAW. INTERPRETATION OF IMPLIED CONSENT LAWS BY THE COURTS. PT. 3

by Robert H. Reeder

Published in *Traffic Digest and Review* v19 n6 p16-24 (Jun 1971)

refs

Court decisions on right to counsel as applied to implied consent laws are reviewed. It is concluded that the driver does not have a right to consult an

3/1 Alcohol (Cont'd.)

HS-010 382 (Cont'd.)

attorney before making his decision whether to submit to the chemical test except in a very few states. The purpose, benefit, and provisions of implied consent laws are outlined.

Search terms: Implied consent laws; Constitutional law; Court decisions; Legal rights; Alcohol blood tests; Alcohol breath tests; Alcohol chemical tests; Alcohol test refusal; Lawyers; Arrests

HS-010 383 Fld. 3/1; 4/1

KNOW THE LAW. INTERPRETATION OF IMPLIED CONSENT LAWS BY THE COURTS. PT. 4

by Robert H. Reeder

Published in *Traffic Digest and Review* v19 n8 p17-24 (Aug 1971)

refs

Requirements for an arrest for drunken driving differ in various states but may not include the requirement that the officer actually witness the misdeamnor. Cases and examples are given and statute changes are suggested to make implied consent laws fully operative.

Search terms: Implied consent laws; Alcohol blood tests; Alcohol laws; Drinking drivers; Court decisions; Arrests; Alcohol test refusal; Drinking driver evidence; Alcohol chemical tests

HS-010 384 Fld. 3/1; 4/7

BLOOD ALCOHOL LEVELS IN DRIVERS NOT INVOLVED IN ACCIDENTS AND THE LOG-NORMAL DISTRIBUTION

by Brian O'Neill; W. T. Wells

Published in *Quarterly Journal of Studies on Alcohol* v32 n3 p798-803

11 refs

Recent conclusions, based on lognormal probability distributions, concerning the proportion of impaired drivers in non-accident-involved populations are shown to be mathematically incorrect. The distribution of blood alcohol concentrations from one group of nonaccident drivers is significantly different from the best fitting two-parameter lognormal distribution. Reducing the mean of all drivers' blood alcohol concentrations will not necessarily reduce the proportion of impaired drivers. General countermeasures against drinking and driving cannot be justified as the only way to reduce the proportion of intoxicated drivers.

Search terms: Blood alcohol levels; Driver intoxication; Drinking drivers; Statistical analysis; Probability theory; Parameters; Mathematical models; Logarithms

3/2 Anthropomorphic Data

HS-010 385 Fld. 3/2

VITAL STATISTICS OF PASSENGER-CAR OCCUPANTS FOR EACH VEHICLE SEATING POSITION

by John A. Green

Published in *HIT LAB Reports* p4-7 (Apr 1971)

3 refs

Distribution characteristics for the age, sex, height, and weight of passenger-car occupants are calculated as a function of their seat position within the vehicle. The data were extracted from HSRI accident data files; consequently they represent conditions found in accident-involved vehicles only. The findings presented here demonstrate significant differences in the populations utilizing the various seating positions. It is hoped that these findings may prove helpful in restraint system design.

Search terms: Seat occupation; Passengers; Seat occupation by age; Human body height; Human body weight; Front seat passengers; Rear seat passengers; Children; Females; Males; Age factors; Sex factors

HS-010 386 Fld. 3/2

HEART RATE MEASUREMENTS OF DRIVERS WITH THE HIGHWAY SYSTEMS RESEARCH CAR

by Fletcher N. Platt

Published in *Industrial Medicine and Surgery* v38 n10 p339-48 (Oct 1969)

12 refs

Presented at the 115th annual session, Medical Assoc. of Georgia, Savannah, 5-7 May 1969.

A number of studies on heart rate of drivers are described. Heart beat rate of drivers was monitored by steering-wheel electrodes in various driving situations. The rate may increase, decrease, or stay constant over the series of stimuli encountered in a driving task, but deviation from the mean and range of lowest and highest rates may differ for different drivers. With more than 100 subjects, driver's heart rate usually increased five points or more under stress. Significant correlations were observed between heart rate variation and passing a car, time of day, freeway ramp entry, long trips, adverse driving conditions, mild sedation, and intoxication.

Search terms: Heart rate; Statistical analysis; Driver fatigue; Driver monitoring; Passing; Driver performance under stress; Driver intoxication; Trip length; Sedatives; Driving tasks; Steering; Ramps; Driving conditions; Environmental factors; Highway Systems Research Car; Time of day; Driving task analysis

Driver Behavior

O 387 Fld. 3/4; 1/3

DENT PRONENESS. RE-
CH IN THE OCCURRENCE,
ATION, AND PREVENTION
OAD ACCIDENTS

ette Shaw; Herbert S. Sichel

ed by Pergamon Press, New York

500p 200 refs

11 of *International Series of*
ographs in Experimental Psy-
ogy. Includes HS-010 388 thru 406,
10 408 & 413

oncept of accident proneness has
checkered career, from the early
work whose high scientific stan-
as been universally acknowledged,
gh a period when the concept was
led beyond the sound basis which
een laid, to a period of reaction
doubt was thrown on the very
nce of such a notion. This book
ines in detail the arguments
ht forward by both sides of this
ific controversy, and studies in
the facts and figures quoted in
rt. It brings new and convincing
ce from the authors' own fifteen
study and the personal views of
nt researchers from five different
ries. Its main interest lies in its
date coverage of international re-
findings on accident causation.

rch terms: Accident proneness;
iews; Research methods; Statistical
lysis; Accident risk forecasting;
ver personality; Driver behavior;
ver attitudes; Accident research;
rnational factors; Psychological
ors; Driver characteristics; Driver
ords

HS-010 388 Fld. 3/4; 1/3

ACCIDENT PRONENESS – FACT AND FICTION

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p3-10

Whereas the concept of accident proneness is accepted as a fact of life by the common man, it does not receive anything like the same unanimous backing from scientists. Particularly in the United States, and to a lesser but still noticeable extent in Britain and other countries, accident literature has developed a marked anti-proneness bias. This book does not attempt to review accident research literature but rather endeavours to trace the trends of thinking on accident proneness and the developments which have influenced present attitudes, to see whether it is possible to discover the underlying reasons for the disagreements and the contradictions.

Search terms: Accident proneness; Accident repeater drivers; Accident research; Psychological factors; International factors; Driver behavior

HS-010 389 Fld. 3/4; 1/3

METHODS AND APPROACHES

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p11-27

The concept of accident proneness implies that people differ fundamentally in their innate propensity to accidents. In order to study that concept scientifically, and to prove that it has validity, there are a number of factors which need to be investigated: do some peopl^ really have more accidents than others; what contributions do "accident prone" people make to the total accident picture; what personal characteristics are associated with accident proneness; are group psychological tests suitable for accident work; and are group statistical techniques suitable for accident data? These are some of the essential lines of investigation which one could expect scientists to follow if they wished to make a thorough investigation of the proneness concept. A few of the usual statistical and psychological approaches to accident research are examined in this chapter and their advantages and disadvantages considered.

Search terms: Statistical analysis; Accident proneness; Scientific method; Research methods; Reviews; Psychological factors; Accident research; Driver behavior

HS-010 390 Fld. 3/4; 1/3

BEGINNINGS OF EMPIRICAL RESEARCH

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p28-38

The earliest studies on accident proneness were German ones, but few are remembered, except perhaps Bortkiewicz' study on horsekicks among Prussian cavalrymen, and Marbe's work on the law of recurrence. The truly systematic study of the personal element in accidents began in England fifty years ago with the project of Greenwood, Woods and Yule (1919, 1920) which dealt with minor injury accidents sustained by women workers in munition factories. Greenwood and his team made a thorough statistical analysis of the accident records of several factories and concluded: "But so far as our present knowledge goes, it seems that the genesis of multiple accidents under uniform external conditions is an affair of personality and not determined by any obvious extrinsic factor such as lesser or greater speed of work." The next major study was done by Newbold in 1926; it was also an industrial statistical one and was designed as a background for a more detailed psychological one to be carried out later by Farmer and Chambers in 1939.

3/4 Driver Behavior (Cont'd.)

HS-010 390 (Cont'd.)

Search terms: Accident proneness; Scientific method; Research methods; Psychological factors; Accident studies; Industrial accidents; International factors; Accident research; Driver behavior

HS-010 391 Fld. 3/4; 1/3

DEVELOPMENT OF PRE-WAR RESEARCH

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p39-60

One of the earliest American publications to deal with the subject of accident proneness was Viteles' book *Industrial Psychology* (1932). He gives a most interesting description of the various testing programs which had been designed for the selection of motormen driving electric streetcars, in Europe as well as in the United States. Everything Viteles said about the individuality of susceptibility to accidents has been borne out over and over again. A much less justified, but far more publicized source of encouragement for the harboring of exaggerated ideas about the all-importance of accident proneness seems to have been the Connecticut study (Cobb, 1939). A critique of the Connecticut study was written by Forbes in 1939 but it appeared unnoticed until the sixties when it was rediscovered by a section of American research opinion, and since then it has been repeatedly used to demonstrate the fallacy of the whole idea of accident proneness.

Search terms: Accident proneness; Research methods; Statistical analysis; Psychological tests; Reviews; Accident research; International factors; Psychological factors; Driver behavior; Streetcar operators

HS-010 392 Fld. 3/4; 1/3

EARLY POST-WAR RESEARCH

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p61-80

The publications which appeared to have had the most marked effect on the thinking of the period from the end of the forties through the early sixties were contributed by researchers from a number of different countries: Tillman and Hobbs (Canada); Adelstein and Kerrich and Arbous (South Africa); Thorndike and McFarland (USA); Hakkinen (Finland). The first of these, Tillman and Hobbs' psychological study, confirmed the relationship between road accidents and personal and social maladjustment. Adelstein's statistical study on accidents among shunters on the South African Railways was used time and again in later years to demonstrate the fallacy of the proneness concept, despite the fact that Adelstein expressed himself in favor of the concept. McFarland, Moore, Arbous, Kerrich and Thorndike agreed with Adelstein. They all accepted, McFarland more guardedly than the others, that it was very likely that people did differ in their propensity to accidents, but that not much actual scientific proof of this had so far materialized – probably because the existing techniques, both statistical and psychological, were inadequate for dealing with anything as complex as accident liability had turned out to be.

Search terms: Accident proneness; Reviews; Research methods; Psychological tests; Statistical analysis; Accident studies; Industrial accidents; Accident research; International factors; Psychological factors; Accident rates; Accident factors; Driver behavior

HS-010 393 Fld. 3/4; 1/3

FINLAND'S CONTRIBUTION

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p81-93

The first European study to embody the American statistical approach was Hakkinen's (Finland) *Traffic Accidents and Driver Characteristics* (1958). This detailed an investigation into the value of certain psychological tests for detecting various levels of accident proneness. Hakkinen's methods are reviewed at length in this chapter. Hakkinen's study provided very strong confirmation of the concept of accident proneness. His statistical material provided positive evidence of proneness over long periods of time, and this was supported by the psychological aspect, where durable psychological characteristics were found to correlate significantly with a reliable accident criterion. His contribution to the scientific knowledge of accident proneness appears to have been very largely ignored by the Americans – with the exception of Coppin (1964-7). The positive evidence he produced in support of the concept did not seem to have had any effect whatever on the development, particularly in American research circles, of the current strong anti-proneness bias.

Search terms: Accident proneness; Research methods; Psychological tests; Bus drivers; Streetcar operators; Driver characteristics; Driver behavior; Statistical analysis; Psychological factors; Accident research; Finland; Accident rates; Driver experience; Driver physical examinations

HS-010 394 Fld. 3/4; 1/3

YOUTH AND THE AUTOMOBILE IN AMERICA

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p94-113

In the United States, during the late fifties and early sixties, the whole approach to the question of accident proneness was still one of open-minded inquiry. Conger's study (1957, 1959) was one of the most important of the period because this was the first combination of the clinical and the experimental approach. Conger felt that despite the technical difficulties which beset projects on accident proneness, the weight of the scientific evidence nevertheless suggested that significant differences did exist between the accident repeaters and the accident free. Rommey, 1959, made a study of high school students in Pennsylvania and gave a profile of the accident free and the accident repeater. McFarland and Moore (1960) wrote a paper *Youth and the Automobile* where they reviewed the role of the automobile in the cultural and behavioral patterns of young drivers. Barmack and Payne (1961) investigated the accident rate among young servicemen and found that two thirds of the drivers admitted to pre-accident drinking. They then studied the effect of countermeasures and found that the accident rates had been halved.

Search terms: Accident proneness; Research methods; Psychological factors; Psychological tests; Adolescent drivers; Young adult drivers; Accident free drivers; Accident repeater drivers; Driver behavior; Driver characteristics; Driver attitudes; Accident rates; Drinking drivers; Accident records; Accident research; Driver physical examinations

HS-010 395 Fld. 3/4; 1/3

RESEARCH ON ADULT DRIVERS

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p114-34

Though most of the bigger studies of the late fifties and early sixties were concerned with young drivers, the period also witnessed the publication of some studies on widely divergent aspects of the accident problem. One of these was Porterfield's study *Traffic fatalities, Suicide and Homicide* (1960) where he found that aggressive hazardous driving is likely to be characteristic of persons similar to those who have suicidal, homicidal or both tendencies – and vice versa. One other study was Malfette and Fine's *Characteristics of Safe Drivers – a Pilot Study* (1962), the safe driver being a non-aggressive individual with a high-level of impulse control. An investigation in another different field was the study on accident occurrence among African and Coloured bus drivers in South Africa (Shaw and Sichel, 1961, Sichel, 1965, and Shaw, 1965). The whole program was based on the fundamental belief that people differ greatly in their susceptibility to accidents, that these differences are lasting ones, and that these differences can be predicted by means of suitable tests.

Search terms: Accident proneness; Research methods; Statistical analysis; Psychological tests; Reviews; Accident risk forecasting; Driver characteristics; Driver behavior; Driver attitudes; Accident free drivers; Accident repeater drivers; Accident rates; Driver records; Fatality rates; Bus drivers; Accident research; Republic of South Africa

HS-010 396 Fld. 3/4; 1/3

EUROPEAN RESEARCH

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p135-48

This is a brief description of research developments in Europe during the fifties and early sixties. The European countries always appear to have been aware of developments in America research, but the contrary is not the case. Europeans are not as statistically minded as the Americans, and they are prepared to accept what they consider to be a reasonable concept on its merits, and to them, the concept of proneness, particularly with regard to road accidents, has always been a most reasonable one. Two studies are considered here: Walbeehm's *The accident-prone driver*, 1960, Netherlands, is a general dissertation and a review of the literature on accident proneness as seen by the Europeans; and two papers by Grunert (1961a, b, Germany). Grunert's papers are excellent examples of the clinical approach to the study of accident proneness adopted by many of the German psychologists. Grunert describes what he calls the "accident disposition" of various kinds of driver, wherein he feel lies the "germ" of the accidents in which they become involved.

Search terms: Accident proneness; Research methods; Driver characteristics; Driver behavior; Driver personality; Accident research; Germany; Netherlands; International factors; Physical examinations

HS-010 397 Fld. 3/4; 1/3

THE PENDULUM STARTS TO SWING

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p149-65

By the beginning of the sixties, a clear picture of the sort of people most likely to be involved in motor accidents had begun to emerge. It seemed that the research on accident proneness should have moved forward to find out more about the extent to which people differed in their propensity for accidents, and the reasons why they differed, and to utilize this knowledge as part of a multipronged practical attack on the road accident problem. But, starting in the United States and gradually spreading to other parts of the world, a most unexpected reactionary trend set in. Two completely divergent schools of throught began to emerge. As the sixties progressed, the gap widened, till now, a most confusing state of affairs exists. Different countries hold widely different views, and scientific opinion on accident proneness ranges all the way from outright denial of the validity of the concept, to unequivocal acceptance of it, and the belief that proneness (and its implications) is one of the vitally important factors in the whole road-accident situation.

3/4 Driver Behavior (Cont'd.)

HS-010 397 (Cont'd.)

Search terms: Psychological factors; Accident proneness; Reviews; Driver characteristics; Driver behavior; Accident research

HS-010 398 Fld. 3/4; 1/3

ERA OF DOUBT

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p166-90

This chapter shows how the drastic changes in the thinking on accident proneness have been brought about not by new evidence, but by the sheer weight of repetitive statements of what really amounts to little more than an opinion, and what is more, an opinion based on unrepresentative and very out of date research findings. It seems that the organized drive to discredit the theory of accident proneness originated around 1960 in a group of American psychologists and was associated with the Association for the Aid of Crippled Children – Suchman's report *Current Research in Childhood Accidents*, 1960 – MacIver, *Safety and Human Behavior*. The next of the critiques to appear were Goldstein's papers *Where We Are in Accident Research* and *Research on Human Variables in Safe Motor, Vehicle Operation: a Correlation Summary of Predictor Variables and Criterion Measures*. In Europe, the American pronouncements against proneness were taken at face value and often misinterpreted – Norman's report, Great Britain, 1962. In virtually all the critical papers on proneness, no distinction is made between different types of accidents; and an argument based on accidental poisoning in three-year-olds is being used to support a contention on speeding accidents among adult drivers.

Search terms: Accident proneness; Reviews; Accident research; Driver behavior; Psychological factors; Driver attitudes; Driver personality; Driver characteristics

HS-010 399 Fld. 3/4; 1/3

ERA OF DISBELIEF

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p191-216

From Belfast, Northern Ireland, came an original study *The Causation of Bus Driver Accidents*, 1963. Its authors, Cresswell and Froggatt, concluded that the validity of the concept of accident proneness is more than doubtful. In the United States, the same group of psychologists connected with the Association for the Aid of Crippled Children, proposed the preparation of a sponsored book on the behavioral aspects of accident research, which led to the publication in 1964 of Haddon's *Accident Research*. There were other publications which influenced the current thinking on accident proneness like Haight's *Accident Proneness, the History of an Idea*, 1964, where his contention was that the idea was now meeting the just fate of a once-popular myth. No major critiques of the concept have been published since 1964 – it being apparently now accepted that there is no need for futher argument, and that all that needs to be said has already been said.

Search terms: Accident proneness; Reviews; Accident research; International factors; Psychological factors; Bus drivers; Driver behavior; Northern Ireland; Bus accidents; Driver characteristics; Research methods

HS-010 400 Fld. 3/4; 1/3

CURRENT VIEWS ON ACCIDENT PRONENESS

by Sauli Hakkinen; A. Garth Arbous; John E. Kerrich; Gunter Schubert; Wolfgang Bocher; Aart van der Burgh; Raymond C. Peck; Ronald S. Coppin

Published in HS-010 387, *Accident Proneness*, New York, 1971 p217-36

These are the up-to-date views of some of the most prominent research workers in the field, the men whose publications, whether they have been quoted, misquoted, or ignored, have formed an integral part of the history of the accident proneness controversy. It would seem that the supporters of accident proneness have not changed their views, and that even some of the people most often quoted for "exposing" the fallacy of the whole idea have in fact been rather misquoted.

Search terms: Accident proneness; Psychological factors; Research methods; Driver personality; Driver behavior; Accident research; International factors; Finland; West Germany; Republic of South Africa; Netherlands; Driver characteristics

HS-010 401 Fld. 3/4; 1/3

PREDICTING ACCIDENT POTENTIAL

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p299-334

If accident proneness has been shown to be a scientific reality, then the next question that remains still unanswered is "Is it predictable?" The only study where future proneness has been predicted, and where the accuracy of these predictions has been scientifically evaluated, is the one by Public Utilities Transport Corp., South Africa. The author describes another aspect of this study, namely the use of projective tests of the TAT type for the practical selection of professional bus drivers in terms of their accident potential.

Search terms: Accident risk forecasting; Accident proneness; Accident research; Bus drivers; Accident records; Driver psychological tests; Driver personality; Driver attitudes;

Driver behavior; Driver records; Research methods; Republic of South Africa; Driver characteristics; Psychological factors

HS-010 402 Fld. 3/4; 1/3

ACCIDENTS AND PERSONALITY

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p335-71

The validation studies reported in the last chapter provide very strong quantitative information of the close relationship which exists between accidents and personality. A profile of the good, fair, borderline, and poor accident risk driver is given along with case reports illustrating the correlation between the particular personality pattern of a driver, his accident potential, and his driving record. A review of Parry's *Aggression on the Road*, Guenault's (RRL) *The Systematic Observation of Driving Behavior*, Greenshields and Platt's study (1967), and Eysenck's study is included.

Search terms: Accident risk forecasting; Accident proneness; Accident risks; Driver personality; Problem drivers; Psychological factors; Aggression; Driver behavior; Driver characteristics; Driver records; Accident research; Anxiety; Driver sex; Driver age; International factors

HS-010 403 Fld. 3/4; 1/3

THE NETWORK OF ACCIDENT CAUSATION (1)

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p372-96

This is a very general discussion in which research findings on all the different practical implications. The exposure element, the driving experience, the age of the driver, the medical aspects of accident involvement, and vision are reviewed and discussed.

Search terms: Accident factors; Accident proneness; Accident risks; Driver experience; Driver age; Medical factors caused accidents; Driver mental fitness; Driver physical fitness; Vision; Accident research; International factors; Accident rates; Driver characteristics; Driver sex; Marital status; Accident causes

HS-010 404 Fld. 3/4; 1/3

THE NETWORK OF ACCIDENT CAUSATION (2)

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p397-415

The relationship between accidents and intelligence, between accidents, driving ability and psychomotor functions, the importance of temporary factors, of alcohol and drugs, and the effects which social factors and discipline have on accidents are reviewed and discussed. There is no denying the fact that accidents have many causes or that the detailed investigation of any particular accident would reveal that it had been precipitated by a number of different factors, some environmental, some person-centered, and all helping to precipitate it. But in the light of research findings from all over the world, there can be equally little doubt that the person-centered factors play an extremely important role, and that they represent a potential for accidents which is anything but equal from one driver to another.

Search terms: Accident causes; Accident factors; Accident proneness; Driver characteristics; Driver skills; In-

effects; Driver personality; Environmental factors; International factors; Driver physical fitness; Driver mental fitness

HS-010 405 Fld. 3/4; 3/1

WHAT OF THE FUTURE?

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p416-22

Actual research findings on accident proneness do not support extreme thinking in either direction. In fact the only policy they support is a truly moderate one which conceives of accidents as having many causes – all of them needing urgent attention––which allows for environment–caused as well as driver–caused accidents. Accident proneness is not a static function, as there are different degrees and kinds of accident proneness. To have any real meaning, the concept of accident proneness must be a flexible one which allows for proneness to manifest itself in different ways in different people and for different reasons, to be liable to change over time, and, in its less deeply ingrained forms, to be amenable to remedial measures such as training or discipline, or to the pressures exerted by social opinion.

Search terms: Accident proneness; Accident research; Driver behavior

HS-010 406 Fld. 3/4; 3/6; 1/3

THE SOUTH AFRICAN BUS DRIVER STUDIES

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p264-98

Some of the statistical data available from the records of the PUTCO (Public Utility Transport Corporation) bus

3/4 Driver Behavior (Cont'd.)

HS-010 406 (Cont'd.)

populations in which: the variation of talent among population members was apparently high due to non-stringent pre-selectivity; the accident rate of the population exhibited wide variability; and the population was exposed to many accident contingencies. The conclusion to be drawn from this study is that traffic accident offenders count for as much as they are allowed to count for: the more tolerance that was shown to these offenders, even in long-service groups, the greater their contribution to the total accidents of the group—and at the same time the higher was the accident rate of the company as a whole—and vice versa. This analysis provides even stronger confirmation than Hakkinen's findings that accident proneness is a scientific reality.

Search terms: Accident proneness; Accident rates; Accident statistics; Driver performance; Driver records; Bus drivers; Accident repeater drivers; Republic of South Africa; Accident research; Traffic congestion; Time factors; Accident severity; Driver improvement; Driver experience

HS-010 407 Fld. 3/4; 3/6

CONVICTED AND NON-CONVICTED DRIVERS—VALUES OF DRIVER INDICES

by S. W. Quenault; C. F. Harvey

England Road Res. Lab.

1971 26p 5 refs
Report no. RRL-LR-395

Drivers convicted of careless driving and drivers not so convicted were studied through observation of their driving behavior indices during test drives. Indices included use of mirror, signals, speeds, lapses, unnecessary maneuvers, risks, and near accidents. The convicted group used their rear-view mirrors less than the non-convicted group, gave fewer signals, showed more extremes of overtaking behavior, drove at an average higher speed in the de-restricted zones, showed more lapses, carried out more unnecessary maneuvers and took more risks. The characteristic patterns of driving behavior within both the convicted and non-convicted groups showed many differences. These results imply consistency of observation and classification and the ability of the method of systematic observation of driver behavior to show meaningful differences in driver behavior between classes of drivers.

Search terms: Driver behavior; Driver records; Accident records; Traffic law violators; Careless driving; Driver classification; Driver performance; Driver tests; Driver to driver communications; Driver skills; Road tests; Driver characteristics; Great Britain; Speed; Mirror usage; Overtaking

HS-010 408 Fld. 3/4; 4/7; 3/1

NEW STATISTICAL TECHNIQUES FOR THE EVALUATION OF THE CONCEPT OF ACCIDENT PRONENESS

by Herbert S. Sichel

Published in HS-010 387, *Accident Proneness*, New York, 1971 p425-56

Earlier attempts at fitting binomial distributions to accident frequencies failed for a number of reasons. To study the personal factor, statistical methods must be person centered and not influenced by others' accidents, use all data to exclude no risk group, test the hypothesis of constant individual liability, and permit statistical reliability estimates such as confidence intervals. Required individual data are period of exposure in equal-exposure units, number of accidents, and mileage or date of occurrence. The suggested techniques describe statistical control charts, point estimation of individual liability, sampling distribution, confidence limits, criteria for classification of individuals and testing differential accident liability, and reliability of the accident-interval criterion.

Search terms: Accident proneness; Accident research; Accident risks; Research methods; Statistical analysis; Mathematical models; Confidence intervals; Event rates; Sampling; Driver behavior

HS-010 409 Fld. 3/4; 5/2

ROADEO. BUS DRIVERS DO THEIR THING

by Jean E. Richert

Published in *School Bus Fleet* v14 n5 p15-7 (Oct/Nov 1969)

The Wayne County School Bus Roadeo was held in Taylor, Michigan, to motivate school bus drivers to improve their skills. It consisted of a written examination and ten field tests. The most valuable result of the roadeo was the knowledge the supervisors gained in evaluating their own training programs as the tests showed up the deficiencies in the bus driver education programs. Women bus drivers won the first three prizes.

Search terms: School bus drivers; Driver performance; Driver skills; Driver motivation; Driver tests; Driving tasks; Roadeos

HS-010 410 Fld. 3/4; 5/2

RECRUITING SCHOOL BUS DRIVERS

by Harold E. Dacus

Published in *School Bus Fleet* v14 n5 p21-3 (Oct/Nov 1969)

Presented at Southeastern States Pupil Transportation Conference, 1969.

There is a great need for dedicated and dependable school bus drivers. Some ideas on the recruitment and selection of school bus drivers are presented and discussed.

Search terms: School bus drivers; Driver characteristics; Manpower utilization

HS-010 411 Fld. 3/4; 5/18

PRELIMINARY RESULTS FROM DOUBLE-STEERING-WHEEL ROAD TESTS

by Henry Szostak

California Univ., Berkeley

1968 60p
Grant U100016-03
Report no. 68-10

The double-steering-wheel device was recently developed to permit determinations of the human driver's frequency-response under near-normal highway conditions. Facing–function signals drove an additional wheel atop the standard one. The report describes testing equipment, conditions, and procedure for three subjects. It also presents results from the first of 12 test runs and tentative theoretical analysis. A computer model was compared with road test results.

Search terms: Steering; Steering force; Driver modeling; Road tests; Driver reaction time; Driver task analysis; Flow charts; Fourier analysis; Computerized simulation; Driver vehicle road interfaces; Mathematical models; Mathematical analysis; Steering wheels; Instrumented vehicles; Transfer functions

HS-010 412 Fld. 3/4

A FIELD TRIAL OF YOUNG DRIVERS

by Stanley H. Schuman; Donald C. Pelz

Published in *Archives of Environmental Health* v21 p462-7 (Sep 1970)

11 refs

As a result of findings from two types of study of young drivers in Michigan a behavioral longitudinal survey of a probability sample and a surveillance police-based study of statewide fatal accidents, target areas of young driving behavior are indicated for the design and execution of a spring field trial in Michigan in 1970 to test the feasibility and efficacy of several countermeasures (group discussion, recognition letter, and police program) in a sample of high school seniors to reduce moving violations and accidental injuries. Although the scale of the study is probably too small for definitive results, the detection of demonstrable effects in test groups compared to controls should lead to the design and execution of more extensive trials in a very difficult area of high morbidity and mortality.

Search terms: Michigan; Age factor in driving; Driver behavior; Adolescent drivers; Accident risks; Accident prevention; Accident rates; Fatality rates; Accident risk forecasting; Age factor in accidents; Psychological factors; Traffic law violations; High school drivers; Probability theory; Young adult drivers; Male drivers; Accident studies

3/6 Driver Licensing

HS-010 413 Fld. 3/6; 3/4; 1/3

THE CALIFORNIA DRIVER RECORD STUDY

by Lynette Shaw

Published in HS-010 387, *Accident Proneness*, New York, 1971 p237-63

The main issues at stake and the main points of disagreement on the concept of accident proneness are reviewed. The 1964 California Driver Record Study, Coppin et al, is then considered. The California study deals with the general public and therefore with the accident problem as a whole. Three main indices of driving behavior were taken: accidents; convictions; negligent operator count. Coppin's study shows that people with a high accident rate tend to have more than the average number of traffic violations.

Search terms: Reviews; Accident records; Driver records; Accident repeater drivers; Point systems; Accident risks; Problem drivers; Accident proneness; Driver characteristics; Driver mileage; Traffic law violators; Careless driving; Driver behavior; Male drivers; Female drivers; Accident risk forecasting; Accident research; California

3/7 Drugs Other Than Alcohol

HS-010 414 Fld. 3/7; 3/1

EFFECT OF BETA-ADRENERGIC BLOCKADE AND ALCOHOL ON SIMULATED CAR DRIVING

by V. Goldman; B. Comerford; D. Hughes; G. Nyberg

Published in *Nature* v224 n5225 p1175-8 (20 Dec 1969)

18 refs

For a long time alcohol has been thought of as the only common toxic agent worth considering as a cause of car accidents, but more attention is now being paid to the influence of other drugs, alone or in combination with alcohol. This study was designed to determine whether alprenolol, 1-(0-allylphenoxy)-3-isopropylamino-2-propanolol hydrochloride, would affect cardiac action precipitated by the stress of driving, and whether it could impair driving, alone or in combination with alcohol. It is concluded that alprenol is beneficial to patients with ischemic heart disease and that it does not significantly impair performance nor worsen the effects of alcohol.

Search terms: Drug effects;

3/7 Drugs Other Than Alcohol (Cont'd.)

HS-010 414 (Cont'd.)

Synergism; Heart diseases; Stress (physiology); Driver performance under stress; Driving simulation; Heart rate; Alprenolol; Adrenergic beta receptor blockaders

HS-010 415 Fld. 3/7; 3/12

VISUAL DISTURBANCES EXPERIENCED BY HALLUCINOGENIC DRUG ABUSERS WHILE DRIVING

by George E. Woody

Published in *American Journal of Psychiatry* v127 n5 p683-6 (Nov 1970)

17 refs

Prolonged afterimages, visual hallucinations, and alternations of cognition and judgment are three of the many acute effects of hallucinogens. This paper reports three potentially dangerous episodes of visual disturbances that occurred in hallucinogenic drug abusers while driving. Each person acted on his perceptions, and only after he had changed the course of his automobile did he realize that what he had seen was unreal. Each person was sure that he was in an undrugged condition at the time. The use of LSD and other hallucinogens may be introducing a new driving hazard through their ability to cause visual disturbances and spontaneous recurrences of acute effects.

Search terms: Lysergic acid diethylamide; Marijuana; Hallucinations; Afterimages; Drug effects; Hallucinogens; Medical case reports; Vision disorders; Visual perception; Drug addiction

3/11 Pedestrians

HS-010 416 Fld. 3/11; 1/3

TRAFFIC ACCIDENTS INVOLVING CHILD PEDESTRAINS: A PROGRAM FOR THEIR PREVENTION

by John H. Read

Published in *Pediatrics* v44 Supp p838-47 (Nov 1969)

19 refs

Much that is known about child pedestrian accidents is not being used in designing and studying preventive techniques. Experience in some communities has demonstrated effectiveness of countermeasures, including crosswalks, selective enforcement near schools and playgrounds, preschool and early school safety education, and even town planning to separate pedestrians and cars. Common etiological factors are examined: children's play patterns, drivers, vehicles, environment, types of accidents and injuries by age, family, and medical care. The program recommendations given consider these factors; however, the investigator's inability to control numerous variables limits the assessment of effectiveness. Fifteen specific and fourteen general recommendations are given.

Search terms: Pedestrian accidents; Young pedestrians; Pedestrian behavior; Pedestrian sex; Child safety; Child safety education; Accident prevention; Etiology; Epidemiology; Accident investigation; Accident causes; Accident factors

3/12 Vision

HS-010 417 Fld. 3/12

VISUAL FACTORS IN AUTOMOBILE DRIVING, AND PROVISIONAL STANDARDS

American Medical Assoc.

Published in *Archives of Ophthalmology* v81 p865-71 (Jun 1969)

15 refs

Vision, the driver's most important sense, can be measured readily, but not the related functions of visual attention, alertness, interpretation, and decision making. Unfortunately, these factors are subject to wide variation. Driver licensing limitations by degree of visual impairment and accident risk is advocated, similar to existing pilot standards. Increasingly restrictive visual standards are set forth for drivers of private cars, taxis and trucks, and limousines, buses, and emergency vehicles.

Search terms: Classified driver licenses; Driver vision standards; Vision tests; Visual fields; Night vision; Visual acuity; Vision age changes; Vision disorders; Visual degradation; Color perception; Driver license standards; Driver license restrictions; Professional drivers

4/0 OTHER SAFETY-RELATED AREAS

4/5 Governmental Aspects

HS-010 418 Fld. 4/5; 5/21

ABANDONED VEHICLES: A SELECTED BIBLIOGRAPHY

by Mary Z. Kessler

Council of Planning Librarians

1971 8p
Report no. Exchange-bib-192

This bibliography is a selected list of materials that have appeared within the last ten years on the various aspects of the abandoned vehicle problem. Books, pamphlets, and journal articles are included.

Search terms: Bibliographies;

Abandoned vehicles; Scrapped vehicles; Junkyard regulations; Solid waste disposal

AVAILABILITY: Corporate Author $1.50 P.O. Box 229 Monticello, Ill. 61856

4/7 Mathematical Sciences

HS-010 419 Fld. 4/7; 1/2

ACCELERATION PROFILE FOR MINIMUM INJURY

by Robert F. Deery; David D. McNelis

Published in *IEEE Transactions on Bio-Medical Engineering* v17 n4 p292-5 (Oct 1970)

2 refs

For specified initial velocity and stopping distance, the acceleration-distance profile has a major influence on the extent of the injuries sustained by a human subject. Many trauma research and automotive and aircraft safety design considerations involve this relationship. The existence, uniqueness, and form of an acceleration profile which provides a minimum severity index are established in this paper. The profile is shown to produce a severity level 87% of that associated with a constant acceleration level. The form of this "optimum" profile is shown to be relatively insensitive to variations in the medical data utilized to develop the severity level. This result provides analytical support for work in areas where the medical data base is very limited.

Search terms: Injury severity index; Injury research; Mathematical models; Injury prediction; Human acceleration tolerances

HS-010 420 Fld. 4/7; 3/4

A THEORETICAL MODEL FOR ENHANCING TRANSPORTATION SAFETY

by P. J. Stinson

Denver Univ.

1967 5p 5 refs
Report no. ASME-67-WA/BHF-4

Prepared for presentation at American Society of Mechanical Engineers winter annual meeting and Energy Systems Exposition, Pittsburgh, 12-17 Nov 1967.

A measure of performance capability of the transportation safety system consisting of the man, machine, and the external operating environment is proposed. Special consideration is given to the human's unique contributions to the reliability of the system. The reliability of the overall performance of the system implies the ability of the human operator to generate adaptive, optimizing behavior as a function of the changing dynamic requirements of the system. Adaptiveness is defined as the process by which the human operator compensates for changes in the requirements of his tasks. The human operator may optimize his behavior by learning to perceive and vary the parameters which describe the transfer function he has generated. It is necessary to measure the transfer functions which describe human control behavior. The performance capability or effectiveness measure considers tolerance performance limits for all components of the system in terms of effective task accomplishment. The mathematical evaluation of the measure is presented.

Search terms: Mathematical models; Mathematical analysis; Parameters; Vehicle control; Driver behavior; Man machine systems; Hazard perception; Environmental factors; Driver performance; Systems analysis; Driver vehicle interface; Transfer functions; Driving task analysis; Driving task models

5/0 VEHICLE SAFETY

5/1 Brake Systems

HS-010 421 Fld. 5/1

STOPMASTER BRAKE–PARKING AND EMERGENCY BRAKING SYSTEM–AND HYDRAULIC FAIL–SAFE UNIT

by Ralph K. Super; John Borbi

Rockwell-Standard Corp.

5p
Report no. SAE-680163

The Stopmaster brake, which provides a parking and emergency braking system, is described. The operation of both air and hydraulic actuated brakes is discussed, with special emphasis on the features of the hydraulic system, and the operation and performance of the emergency braking system. Apparent applications of this hydraulic fail-safe system are in public utility vehicles, fire equipment using hydraulic service brakes, and probably most important, school buses having hydraulic service brakes.

Search terms: Dual brakes; Auxiliary brakes; Brake system design; Brake performance; Emergency brakes; Hydraulic brakes; Air brakes; Parking brakes; Fail safe systems

AVAILABILITY: SAE

5/3 Cycles

HS-010 422 Fld. 5/3; 5/15

ELECTROBIKE FOR A MIL-A-MILE

by Roy Paananen

A technical digest of this paper appeared in *Electro-technology* v84 n2 p56 (Aug 1969), and is attached.

Electric power can be applied to any bicycle, using readily available storage batteries and motors, retaining pedaling

5/3 Cycles (Cont'd.)

HS-010 422 (Cont'd.)

for boosts in hill climbing or for emergencies. A bicycle's light weight in proportion to payload makes it an efficient means of applying electric power despite the weight of present batteries. Electric bikes would be most effective for short trips and in city traffic.

Search terms: Bicycles; Electric vehicles; Electric motors; Mileage range

5/4 Design

HS-010 423 Fld. 5/4

AUTOMOTIVE SAFETY: PAST, PRESENT AND FUTURE

by Louis C. Lundstrom

General Motors Corp.

1969 14p

Presented to Engineering Society of Detroit, 21 Nov 1969.

During the 1950's, the automotive industry became interested in safety design per se. The influence of motor vehicle safety standards on auto design is discussed. The air cushion restraint is described. Future directions in vehicle safety and occupant protection are outlined.

Search terms: Vehicle safety; Safety standards; Occupant protection; History; Automotive industry; Safety design; Air bag restraint systems; Automobile design

5/6 Fuel Systems

HS-010 424 Fld. 5/6

THE INFLUENCE OF TRAFFIC ON ATMOSPHERIC POLLUTION. THE HIGH STREET—WARWICK

by J. Bullock; W. M. Lewis

Published in *Atmospheric Environment* v2 n5 p517-34 (Sep 1968)

5 refs

The High Street at Warwick (England) is congested and carries a large number of both private and commercial vehicles. Measurements of air pollution in this thoroughfare show smoke levels four to five times greater and lead levels four and one-half to six times greater than in parts of the borough not specifically affected by vehicle exhausts. Even so, the concentration of atmospheric lead is not high enough to be a health hazard. From the ratios of the mean value of smoke and lead at mid-week and weekend, it is deduced that diesel consuming traffic is 50 percent higher in mid-week. Petrol consuming vehicles constitute 60 percent of the mid-week traffic.

Search terms: Lead; Vehicle air pollution; Exhaust effect on health; Exhaust emissions measurement; Air pollution emission factors; Diesel engine exhaust emissions; Exhaust composition; Great Britain; Traffic density; Day of week; Smoke; Wind; Statistical analysis

HS-010 425 Fld. 5/6

FOUR YEARS OF DIESEL ODOR AND SMOKE CONTROL TECHNOLOGY EVALUATIONS—A SUMMARY

by Karl J. Springer; Charles T. Hare

Southwest Res. Inst.

1969 16p 7 refs
Contract PH-86-67-72; PH-22-68-23
Report no. ASME-69-WA/APC-3

Prepared for presentation at the ASME Winter Annual Meeting, Los Angeles, 16-20 Nov 1969.

The authors consider several methods for control of smoke and odor from diesel powered vehicles. In the case of smoke, it appears that reduction of its emission from new engines may be effected by engine design, rating, fueling, and combustion. New engines are being certified for 1970 production with reduced levels of smoke. Maintaining these reduced smoke levels will depend, of course, on maintenance, driver, and fleet practices among other factors. Effective control of diesel odor, however, continues to be elusive although a few approaches such as catalytic mufflers, and improved fuel injection for one type of engine, have demonstrated merit. Much remains to be done in both smoke and odor areas of diesel emission-control technology to identify new control methods and to investigate their performance and cost-effectiveness relationships. Accordingly, this paper is a status report of a continuing long-range program.

Search terms: Diesel engine exhaust emissions; Exhaust odor control; Smoke control; Exhaust emission control; Engine design; Fuel injection; Fuel additives; Catalytic converters; Smoke meters; Diesel fuels

5/15 Propulsion Systems

HS-010 426 Fld. 5/15

COMPATIBLE CONTROLLER—MOTOR SYSTEM FOR BATTERY—ELECTRIC VEHICLE

by J. V. Byrne; J. G. Lacy

Published in *Proceedings of the Institution of Electrical Engineers* v117 n2 p369-76 (Feb 1970)

9 refs
Report no. Paper-6033-P

The thyristor controller and the d.c. motor of a battery-electric vehicle are considered as a system. The advantage of combining a current-controlled chopper regulator, using digital techniques, with a laminated-field series motor is outlined, design criteria are suggested, and an experimental system is described. Performance measurements using specially developed wattmeters are presented, which show the division of losses in the system, and the exceptionally high overall efficiencies over the speed range.

Search terms: Thyristors; Electric vehicles; Regulators; Direct current motors; Experimental engines; Engine design; Propulsion systems; Engine performance

5/22 Wheel Systems

HS-010 427 Fld. 5/22

THE EXPERIMENTAL DETERMINATION OF TYRE MODEL PARAMETERS

by J. R. Ellis; F. Frank; B. J. Hinton

College of Aeronautics (England)

1966 28p 20 refs
Report no. ASAE-2

The analysis of a series of experiments designed to test the various hypotheses regarding the deformed shape of a pneumatic tire during the steering process is described. The experiments consisted of several separate tests: the application of a point lateral force or a moment at one position on the tread band which is restrained at the center of the wheel, and the measurement of the resulting lateral deflection of each point of the tire perimeter; the application of a uniform force around the tire perimeter on a hollow cylindrical form and application of a load at the center of the wheel; direct determination of tread band tension by dynamometer; and estimation of the bending modulus of the tread band by test on sections cut from the tread band. The analysis of the experiments is carried out by first transforming the test results into a Fourier series and determining the spectral content of the bending line with an harmonic analysis. Transfer functions of beam and string models are derived and applied to the test results. A method of considering a three parameter model is described.

Search terms: Tire forces; Tire research; Tire side forces; Tire deflection; Tire moments; Tire tests; Pneumatic tires; Tire treads; Tire force measurement; Lateral force; Fourier analysis; Stress analysis; Transfer functions; Mathematical models; Steering force; Equations

HS-010 428 Fld. 5/22

THE EQUILIBRIUM SHAPES OF TYRES

by J. R. Ellis; F. Frank

College of Aeronautics (England)

1966 21p 28 refs
Report no. ASAE-1

The equations governing the equilibrium shapes of pneumatic tires are reviewed. These equations have been developed in terms of the crown angle of the tire cords, a parameter which it is not yet possible to measure without damage to the tire. By manipulation of the original equations further differential equations are obtained from which the width of the tire is calculated. The solutions of these differential equations are obtained empirically. The resulting formulae enable the cord angle of a cross-bias tire or the position of the ridge of the belt of a radial ply tire to be located once the width and height of the tire are known. An analog computation of the equilibrium shape is proposed.

Search terms: Tire shape; Tire cords; Pneumatic tires; Equations of equilibrium; Radial tires; Tire tests; Tire research; Mathematical analysis; Cross-ply tires

HS-010 429 Fld. 5/22; 5/20

TIRES FOR QUARRY VEHICLES. TIPS ON SELECTION, USES, AND MAINTENANCE PRACTICES

by W. H. Clarke

Goodrich (B. F.) Tire Co.

1968 21p

Presented at the 51st Annual Convention, National Crushed Stone Assoc., Las Vegas, 13-18 Jan 1968.

Tire costs are a major expenditure in mining, quarry and construction operations. Proper selection of sizes, types, and designs of tires is dealt with, together with data and recommendations relating to operation, repair, retreading, and maintenance. Each of these factors are conducive to reducing the overall tire cost per unit hour of operation.

Search terms: Tire selection; Off the road vehicles; Truck tires; Tire storage; Tire characteristics; Tire design; Tire loads; Tire retreading; Tire maintenance; Tire performance; Tire materials; Tire sizes; Tire wear; Tire treads; Heavy duty vehicles; Rubber compounds; Tire repair

NHTSA DOCUMENTS

NHTSA Contractors Reports

HS-800 523 Fld. 4/5

NATIONAL ACCIDENT SUMMARY. STATE SYSTEMS MANUAL. VOL. 1. PREPARATION OF INPUT. FINAL REPORT

Exotech Systems, Inc.

1971 56p
Contract DOT-HS-011-1-011

Report for 21 Oct 1970–19 May 1971.

The National Accident Summary was developed and is currently maintained by NHTSA to accumulate summary data on a nationwide basis relative to highway traffic units, accident assignments, fatalities, and injuries as a function of the nature of the accidents and the variables involved. The objective of this manual is to lend uniformity to the input data, received from the 50 State summaries and the District of Columbia, so that they may be merged by automatic data processing. The manual describes the

NHTSA Accident Investigation Reports (Cont'd)

HS-800 523 (Cont'd.)

need for and the methodology used for standard definitions for the assembling of State files and identity of structure for all files so that they can be merged.

Search terms: Computerized records management; Computer operators manuals; Data acquisition; Data processing; Accident factors; Automated accident records; Federal state relationships; Accident research; Glossaries; Data uniformity; National Accident Summary; Information systems; Information retrieval

AVAILABILITY: NTIS

HS-800 524 Fld. 4/5

NATIONAL ACCIDENT SUMMARY. STATE SYSTEMS MANUAL. VOL. 2. DATA RETRIEVAL AND FILE USE. FINAL REPORT

Exotech Systems, Inc.

1971 50p
Contract DOT-HS-011-1-011

Report for 21 Oct 1970-19 May 1971.

This volume provides guidance for users of the National Accident Summary (NAS) File. The NAS System is described in terms of purpose, what it comprises, who prepares and maintains it, and how its content is organized. Detailed information about the data currently available to users is presented; descriptions of the data retrieval and processing programs currently operational within this system are given; and the utility of the NAS File in various applications is discussed. The volume concludes with the details concerning the procedures for users to follow in order to obtain effective service from the National Accident Summary Systems.

Search terms: Information retrieval; Computer operators manuals; Data acquisition; Data processing; Accident factors; Accident research; Automated accident records; Federal state relationships; National Accident Summary; Information systems

AVAILABILITY: NTIS

HS-800 541 Fld. 4/7; 4/5; 5/14

COMPUTER PROGRAM FOR AN AIR BAG RESTRAINT SYSTEM. FINAL REPORT

by Robert H. Dufort

Cornell Aeronautical Lab., Inc.

1971 82p
Contract FH-11-7574
Report no. CAL-YB-2985-V-2

Technical report for Jul 1970–Sep 1971.

A simulation model was developed to provide an analytical tool for rapidly and inexpensively exploring the approximate performance of an air bag system. Acceleration and rebound of the impacting body are the principal measures of performance; how they are influenced by system design variations are the principal results. Typical design parameters which can be evaluated are inflation pressure, bag size, gross bag shape, vent area, vent actuation pressure as well as other system variables. This report contains the equations and flow charts which describe the model. A program listing in BASIC+ is presented, as are examples for the solution of cylindrical and customized air bags.

Search terms: Air bag restraint systems; Computerized design; Computerized simulation; Computer programs; Flow charts; Restraint system effectiveness; Simulation models

HS-800 583 Fld. 3/2; 1/2

BREAKING STRENGTH OF THE HUMAN SKULL VS. IMPACT SURFACE CURVATURE. FINAL REPORT

by Voight R. Hodgson; L. M. Thomas

Wayne State Univ.

1971 59p 4 refs
Contract FH-11-7609

Forty intact, moist, embalmed human cadavers were dropped with their heads striking at various locations against several surfaces including: forehead against a flat plate, eight inch radius hemisphere, three inch radius hemisphere, and one inch radius cylinder aligned sagittally; frontal boss – one inch radius cylinder; side – flat plate; rear – flat plate. Parameters measured and computer include drop height, velocity, force, head accelerations, pulse duration, injury indices, angular acceleration, and anthropometry. Frontal flat plate impact data is compared to that obtained from the Alderson 50 percentile anthropomorphic dummy. The purpose of this research is to obtain impact data at skull fracture level which can be used to set Federal Motor Vehicle Safety Standards.

Search terms: Cadavers in testing; Skull fractures; Impact forces; Head impact tolerances; Injury severity index; Anthropomorphic dummies; Impact caused injuries; Head injuries; Impact tests; Mathematical models; Injury prediction; Injury research

NHTSA Staff Speeches, Papers, etc.

HS-810 179 Fld. 3/1

THE ATTACK ON ALCOHOL–RELATED HIGHWAY DEATHS: PROGRESS REPORT

by Willard Y. Howell

National Hwy. Traf. Safety Admini-

1971 15p

Prepared for presentation at the Air Force Traffic Safety Conference, Norton Air Force Base, 5-7 Oct 1971.

The Office of Alcohol Countermeasures instituted by the National Highway Traffic Safety Administration has been given the responsibility of a drive to remove excessive drinkers from the road. Previous safety campaigns have failed in their efforts. People need to realize the dangers surrounding high blood-alcohol concentrations. A program was conducted at Lackland Air Force Base in Texas to educate servicemen and change their attitudes towards those who drank excessively and drove recklessly. They were shown that this conduct was not to be condoned but was an example of sick disturbed behavior. The program was successful as evidenced by a 50 to 60% reduction in accidents.

Search terms: Alcohol education; Blood alcohol levels; Safety campaigns; Drinking drivers; Alcohol usage deterrents; Driver intoxication; Alcoholism; Alcohol laws; Problem drivers; Accident rates

AVAILABILITY: NHTSA

HS-810 181 Fld. 3/1

A PROPOSED PROGRAM TO CONTROL THE PROBLEM DRINKING DRIVER FOR CONSIDERATION BY FEDERAL AGENCIES

by Robert B. Voas

National Hwy. Safety Bureau

1970 7p

Prepared for presentation at the 25th Annual Federal Safety Council Conference, Chicago, 27 Oc t 1970.

The National Highway Safety Bureau developed in 1969 an Alcohol Safety Countermeasures Program directed at the problem drinker and, secondarily, at the heavy social drinker whose more occassional abuse of alcohol may lead to a fatal accident. This program embodies nearly three dozen specific alcohol countermeasure proposals and is being implemented in the states throughout the nation through a four point action program which includes: a national public education program conducted by mass media; a program of advanced research and development providing new tools and methodologies for safety program specialists working in the area of alcohol safety; a program of support for state safety efforts through formula matching grants under section 402 of the Highway Safety Act; and a 100% funded program of alcohol safety action projects at the local community level throughout the United States.

Search terms: Safety campaigns; Drinking drivers; Driver intoxication; Federal role; Federal state relationships; Alcohol education; Alcohol usage deterrents; Federal aid; Financing; Problem drivers

AVAILABILITY: NHTSA

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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

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